

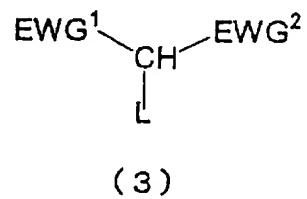
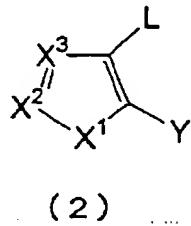
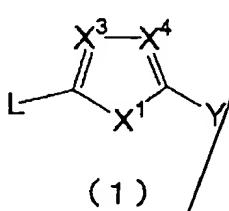
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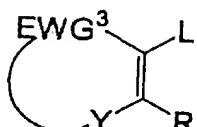
WHAT IS CLAIMED IS:

1. A method for forming an azo colorant, wherein a coupler having a leaving group at a coupling position thereof and a diazo compound are used, and the method has a faster coupling reaction rate than an azo dye-forming reaction between the diazo compound and the coupler having a hydrogen atom at the coupling position.

2. A method for forming an azo colorant, wherein a coupler having a leaving group at a coupling position thereof and a diazo compound are used, and the method has a coupling reaction rate constant  $k$  of at least  $0.1 \text{ s}^{-1}$ .

3. The method for forming an azo colorant according to claim 1, wherein the coupler has a structure represented by one of general formulae (1), (2), (3), (4), and (5) as follows.





(4)

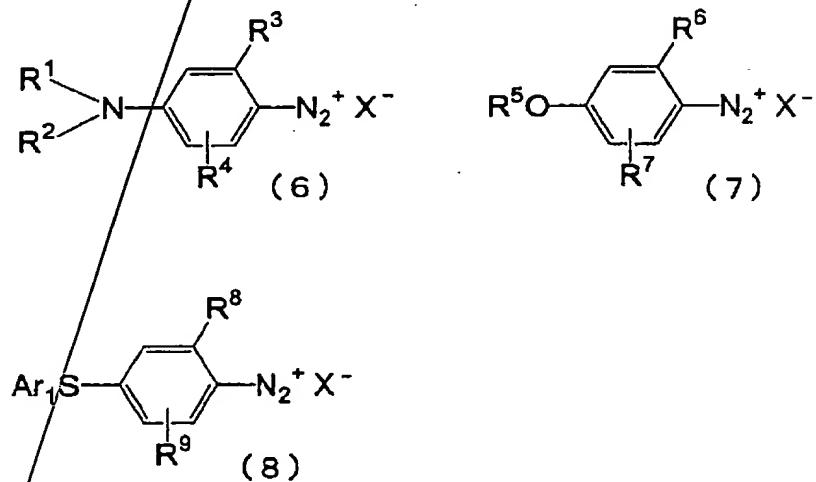


(5)

in which  $\text{X}^1$ ,  $\text{X}^2$ ,  $\text{X}^3$ , and  $\text{X}^4$  each independently represents an atomic group necessary for forming a five-membered aromatic heteroring;  $\text{Y}$  represents one of a hydroxyl group, an amino group which may have a substituent, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent;  $\text{R}$  represents one of a hydroxyl group, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an amino group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent;  $\text{Z}$  represents one of a hydroxyl group and an amino group which may have a substituent;  $\text{Ar}$  represents a benzene ring, naphthalene ring, pyridine ring or quinoline ring, each of which may have a substituent;  $\text{L}$  represents a substituent that is releasable at a time of coupling with the diazo compound;  $\text{EWG}^1$ ,  $\text{EWG}^2$  and  $\text{EWG}^3$  each independently represents an electron-attractive group; and pairs,  $\text{X}^1$  and  $\text{Y}$ ,  $\text{EWG}^1$

and EWG<sup>2</sup>, and Y and R may each link with each other to form a ring.

4. The method for forming an azo colorant according to claim 3, wherein the diazo compound is a compound represented by one of general formulae (6), (7), and (8) as follows.



in which, in general formulae (6) and (7): R<sup>1</sup> and R<sup>2</sup> each represents one of a hydrogen atom and an alkyl group which may have a substituent; R<sup>1</sup> and R<sup>2</sup> may link with each other to form a heterocycle; R<sup>1</sup> and R<sup>2</sup> cannot both be hydrogen atoms; R<sup>3</sup> represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a

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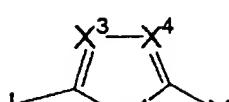
substituent, an arylthio group which may have a substituent, an alkylsulfonyl group which may have a substituent, and an arylsulfonyl group which may have a substituent; R<sup>4</sup> represents one of a hydrogen atom, an alkyl group which may have a substituent, and an alkoxy group which may have a substituent; R<sup>5</sup> represents one of a hydrogen atom and an alkyl group which may have a substituent; R<sup>6</sup> and R<sup>7</sup> each represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent; R<sup>6</sup> and R<sup>7</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion, and

in the general formula (8): Ar<sup>1</sup> represents an aryl group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> each represents one of an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion.

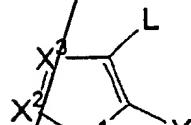
5. The method for forming an azo colorant according to claim 2, wherein the coupler has a structure

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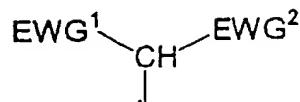
represented by one of general formulae (1), (2), (3), (4), and (5) as follows.



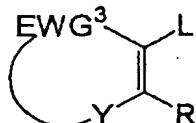
(1)



(2)



(3)



(4)



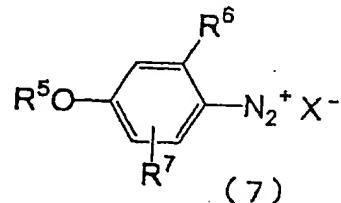
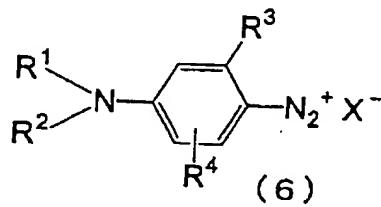
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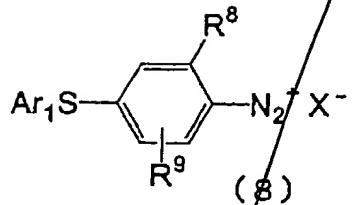
in which X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup>, and X<sup>4</sup> each independently represents an atomic group necessary for forming a five-membered aromatic heteroring; Y represents one of a hydroxyl group, an amino group which may have a substituent, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R represents one of a hydroxyl group, an alkyl group which may have a

*A*  
*C*

substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an amino group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent; Z represents one of a hydroxyl group and an amino group which may have a substituent; Ar represents a benzene ring, naphthalene ring, pyridine ring or quinoline ring, each of which may have a substituent; L represents a substituent that is releasable at a time of coupling with the diazo compound; EWG<sup>1</sup>, EWG<sup>2</sup> and EWG<sup>3</sup> each independently represents an electron-attractive group; and pairs, X<sup>1</sup> and Y, EWG<sup>1</sup> and EWG<sup>2</sup>, and Y and R may each link with each other to form a ring.

6. The method for forming an azo colorant according to claim 5, wherein the diazo compound is a compound represented by one of general formulae (6), (7), and (8) as follows.





in which, in general formulae (6) and (7):  $R^1$  and  $R^2$  each represents one of a hydrogen atom and an alkyl group which may have a substituent;  $R^1$  and  $R^2$  may link with each other to form a heterocycle;  $R^1$  and  $R^2$  cannot both be hydrogen atoms;  $R^3$  represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, an arylthio group which may have a substituent, an alkylsulfonyl group which may have a substituent, and an arylsulfonyl group which may have a substituent;  $R^4$  represents one of a hydrogen atom, an alkyl group which may have a substituent, and an alkoxy group which may have a substituent;  $R^5$  represents one of a hydrogen atom and an alkyl group which may have a substituent;  $R^6$  and  $R^7$  each represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group

which may have a substituent, and an arylthio group which may have a substituent; R<sup>6</sup> and R<sup>7</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion, and

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in the general formula (8): Ar<sup>1</sup> represents an aryl group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> each represents one of an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion.

7. The method for forming an azo colorant according to claim 1, wherein a reducing agent is utilized.

8. The method for forming an azo colorant according to claim 1, wherein a base is utilized.

9. The method for forming an azo colorant according to claim 3, wherein, in the general formulae (1), (2), (3), (4), and (5), L is one of a halogen atom, an alkylthio group which may have a substituent, an arylthio group which may have a substituent, an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an arylsulfonyloxy group which may have a substituent,

a substituent, an acyloxy group which may have a substituent, a benzyloxy group which may have a substituent, a dialkylaminocarbonyloxy group which may have a substituent, a diarylaminocarbonyloxy group which may have a substituent, an alkoxy carbonyloxy group which may have a substituent, an aryloxycarbonyloxy group which may have a substituent, an N-pyrazolyl group which may have a substituent, an N-imidazoyl group which may have a substituent, and an N-benzotriazolyl group which may have a substituent.

10. The method for forming an azo colorant according to claim 2, wherein a reducing agent is utilized.

11. The method for forming an azo colorant according to claim 2, wherein a base is utilized.

12. The method for forming an azo colorant according to claim 5, wherein, in the general formulae (1), (2), (3), (4), and (5), L is one of a halogen atom, an alkylthio group which may have a substituent, an arylthio group which may have a substituent, an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an arylsulfonyloxy group which may have a substituent, an acyloxy group which may have a substituent, a benzyloxy group which may have a

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substituent, a dialkylaminocarbonyloxy group which may have a substituent, a diarylaminocarbonyloxy group which may have a substituent, an alkoxy carbonyloxy group which may have a substituent, an aryloxycarbonyloxy group which may have a substituent, an N-pyrazolyl group which may have a substituent, an N-imidazoyl group which may have a substituent, and an N-benzotriazolyl group

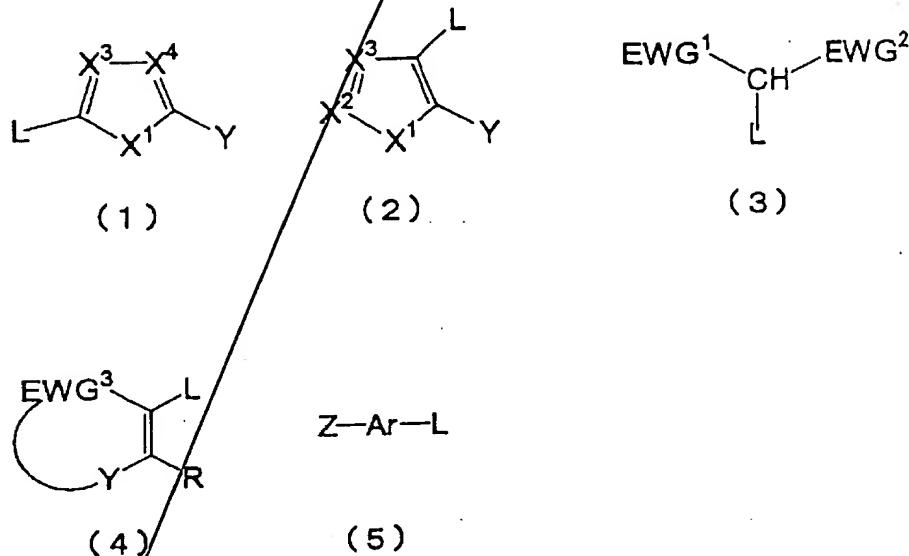
*C*  
*Sub*  
*AZ*

13. A recording material comprising a support and, on the support, at least one recording layer containing a diazo compound and a coupler which reacts with the diazo compound for developing color, wherein the coupler has a leaving group at a coupling position thereof.

14. A recording material comprising a support and, on the support, at least one recording layer containing a diazo compound and a coupler, which reacts with the diazo compound for developing color, wherein the coupler has a leaving group at a coupling position thereof, the diazo compound and the coupler have a faster coupling reaction rate therebetween than in a case of the coupler having a hydrogen atom at a coupling position, and a coupling reaction rate constant  $k$  therebetween is at least  $0.1 \text{ s}^{-1}$ .

15. The recording material according to claim 13,

wherein the coupler has a structure represented by one of general formula (1), (2), (3), (4) and (5).

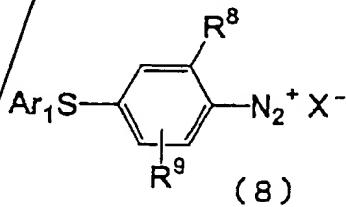
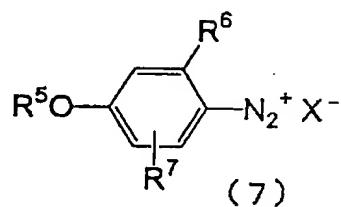
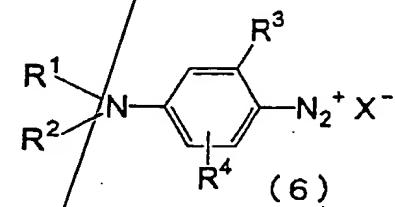


in which  $X^1$ ,  $X^2$ ,  $X^3$ , and  $X^4$  each independently represents an atomic group necessary for forming a five-membered aromatic heteroring; Y represents one of a hydroxyl group, an amino group which may have a substituent, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R represents one of a hydroxyl group, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an amino group which

*OZ*  
*AT*  
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may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent; Z represents one of a hydroxyl group and an amino group which may have a substituent; Ar represents a benzene ring, naphthalene ring, pyridine ring or quinoline ring, each of which may have a substituent; L represents a substituent that is releasable at a time of coupling with the diazo compound; EWG<sup>1</sup>, EWG<sup>2</sup> and EWG<sup>3</sup> each independently represents an electron-attractive group; and pairs, X<sup>1</sup> and Y, EWG<sup>1</sup> and EWG<sup>2</sup>, and Y and R may each link with each other to form a ring.

16. The recording material according to claim 15, wherein the diazo compound is represented by one of general formula (6), (7) and (8).



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in which, in general formulae (6) and (7): R<sup>1</sup> and R<sup>2</sup> each represents one of a hydrogen atom and an alkyl group which may have a substituent; R<sup>1</sup> and R<sup>2</sup> may link with each other to form a heterocycle; R<sup>1</sup> and R<sup>2</sup> cannot both be hydrogen atoms; R<sup>3</sup> represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, an arylthio group which may have a substituent, an alkylsulfonyl group which may have a substituent, and an arylsulfonyl group which may have a substituent; R<sup>4</sup> represents one of a hydrogen atom, an alkyl group which may have a substituent, and an alkoxy group which may have a substituent; R<sup>5</sup> represents one of a hydrogen atom and an alkyl group which may have a substituent; R<sup>6</sup> and R<sup>7</sup> each represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent; R<sup>6</sup> and R<sup>7</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion, and

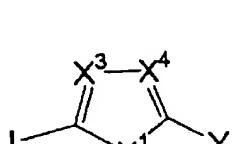
in the general formula (8): Ar<sup>1</sup> represents an

*Ar  
Core*

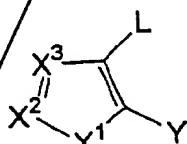
aryl group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> each represents one of an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R<sup>8</sup> and R<sup>9</sup> may be the same and may be different from each other; and X<sup>-</sup> represents an acid anion.

17. The recording material according to claim 13, wherein the diazo compound is contained in a microcapsule.

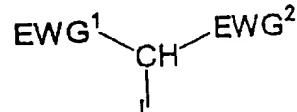
18. The recording material according to claim 14, wherein the coupler has a structure represented by one of general formula (1), (2), (3), (4) and (5).



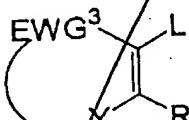
(1)



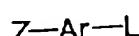
(2)



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(4)



(5)

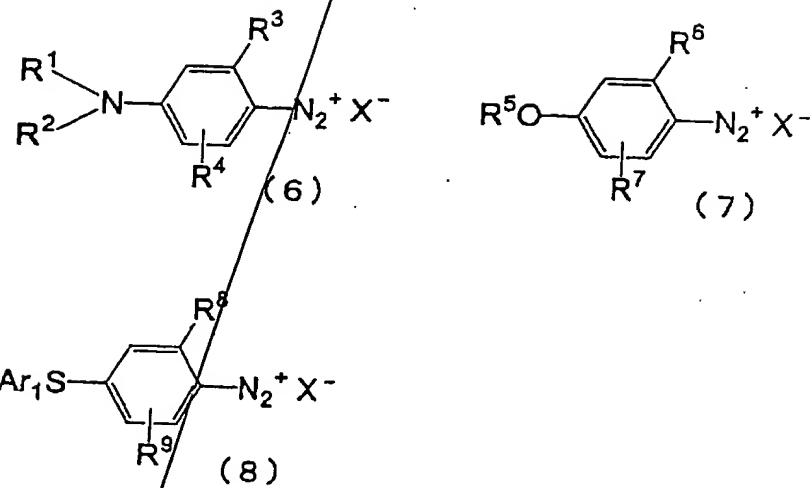
in which X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup>, and X<sup>4</sup> each independently

*OK*

represents an atomic group necessary for forming a five-membered aromatic heteroring; Y represents one of a hydroxyl group, an amino group which may have a substituent, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent; R represents one of a hydroxyl group, an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an amino group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent; Z represents one of a hydroxyl group and an amino group which may have a substituent; Ar represents a benzene ring, naphthalene ring, pyridine ring or quinoline ring, each of which may have a substituent; L represents a substituent that is releasable at a time of coupling with the diazo compound; EWG<sup>1</sup>, EWG<sup>2</sup> and EWG<sup>3</sup> each independently represents an electron-attractive group; and pairs, X<sup>1</sup> and Y, EWG<sup>1</sup> and EWG<sup>2</sup>, and Y and R may each link with each other to form a ring.

19. The recording material according to claim 18, wherein the diazo compound is represented by one of

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general formula (6), (7) and (8).



in which, in general formulae (6) and (7):  $R^1$  and  $R^2$  each represents one of a hydrogen atom and an alkyl group which may have a substituent;  $R^1$  and  $R^2$  may link with each other to form a heterocycle;  $R^1$  and  $R^2$  cannot both be hydrogen atoms;  $R^3$  represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, an arylthio group which may have a substituent, an alkylsulfonyl group which may have a substituent, and an arylsulfonyl group which may have a substituent;  $R^4$  represents one of a hydrogen atom, an alkyl group which may have a substituent, and an

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alkoxy group which may have a substituent;  $R^5$  represents one of a hydrogen atom and an alkyl group which may have a substituent;  $R^6$  and  $R^7$  each represents one of an alkyl group which may have a substituent, an alkoxy group which may have a substituent, an aryloxy group which may have a substituent, an alkylthio group which may have a substituent, and an arylthio group which may have a substituent;  $R^6$  and  $R^7$  may be the same and may be different from each other; and  $X^-$  represents an acid anion, and

in the general formula (8):  $Ar^1$  represents an aryl group which may have a substituent;  $R^8$  and  $R^9$  each represents one of an alkyl group which may have a substituent, an aryl group which may have a substituent, an alkoxy group which may have a substituent, and an aryloxy group which may have a substituent;  $R^8$  and  $R^9$  may be the same and may be different from each other; and  $X^-$  represents an acid anion.

20. The recording material according to claim 14, wherein the diazo compound is contained in a *microcapsule.*

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